science.connect™ 1 glossary

A

abiotic environment abiotic factors; all the non-living components of an ecosystem (p. 274)

abiotic limiting factors the non-living factors such as weather and altitude that limit the number of individuals that an ecosystem can support (p. 261)

absorption the part of the digestive process in which the particle-sized products of food resulting from chemical digestion move into the bloodstream (p. 207)

acid a sour-tasting substance that turns blue litmus paper red and has a pH of less than 7 (p. 63)

acid rain any precipitation that has a pH lower than 5.6 (p. 71)

altitude a measure of the height above sea level; elevation (p. 276)

angiogram an X-ray device contained in a hollow tube that can be fed through an artery to provide a picture of the blood vessels (p. 228)

anorexia anorexia nervosa; a mental illness in which a person is so afraid of gaining weight that they restrict their food intake excessively and may exercise compulsively — usually resulting in malnutrition and other medical complications including heart disease and death (p. 227)

anus the part of the digestive system that discharges the solid mass of undigested food called feces (p. 188)

artery a blood vessel that takes oxygen-rich blood from the lungs and delivers it via the heart to body tissues (p. 188)

artificial heart a mechanical pump implanted in place of a diseased or damaged heart (p. 228)

atom the smallest unit of all matter (pp. 10 & 24)

B

base a slippery, bitter-tasting substance that turns red litmus paper blue and has a pH over 7 (p. 63)

biodegradable any material that can be broken down by organisms in the environment (p. 291)

biodiversity a description of the variety of living things in an area (p. 282)

biological control any organism used to limit a population of unwanted plants or animals (p. 269)

biological magnification the accumulation of chemicals in the bodies of animals found higher on the food chain; the accumulation occurs because they have eaten animals that contained small amounts of the chemical (p. 292)

biome a large geographic area containing distinct plants and animals (p. 281)

biotic community all the living components (biotic factors) of an ecosystem (p. 274)

biotic limiting factors the living parts of an ecosystem that affect the size of population the ecosystem can support (p. 264)

birth rate the number of young produced (births) by a population over a period of time (p. 259)

blood pressure cuff sphygmomanometer; the inflatable cuff and pressure meter used to measure blood pressure (p. 190)

boreal forest the biome consisting of mixed forests of aspen, spruce, and pine trees (p. 281)

Brownian motion the jiggling motion of particles (p. 83)

bulimia bulimia nervosa; a mental illness in which a person is so afraid of gaining weight that they force themselves to vomit in order to get rid of food before digesting it — usually resulting in malnutrition and other medical complications including tooth decay and death (p. 227)

C

Canada's Food Guide a guideline developed by Health and Welfare Canada to help Canadians make healthy eating and lifestyle choices (p. 204)

capillary a minute blood vessel that makes the exchange of oxygen and carbon dioxide possible; the connection between the veins and arteries (p. 188)

carbohydrate a class of nutrient that is the primary source of energy for your body (p. 200)

carbon and oxygen cycles the re-use or cycling of carbon and oxygen in nature through photosynthesis, cellular respiration, and decomposition (p. 249)

cardiac arrest literally: stopped heart (p. 227)

carrying capacity the number of individuals that an environment can support (p. 261)

cell the smallest unit of life; the building block of all living organisms (p. 164)

cell membrane the semi-permeable cell organelle that separates the inner parts of the cell from the surrounding environment (p. 167)

cell wall the non-living organelle within plant cells that protects and strengthens the cell (p. 167)

cellular respiration the chemical change that converts food into energy within a cell (pp. 183 & 238)

CFCs chlorofluorocarbons; a class of refrigerants that damage Earth's ozone layer (p. 299)

chemical digestion the part of the digestive process in which chemicals break food down into smaller pieces (p. 207)

chemical formula a group of letters and numbers that represent the make-up of a compound (p. 36)

chemical property the characteristic of a substance that describes how it will react with other substances (p. 12)

chloroplast the organelle within plant cells that contains chlorophyll pigment; gives plants their colour and provides a large surface area for the collection of sunlight for photosynthesis (p. 167)

circulatory system the system of organs that moves blood throughout the body (p. 188)

clay the smallest particles that make up soil; form a flexible mass when wet (p. 278)

climate average weather conditions based on long-term records (p. 276)

competition the competition among organisms for resources such as food, shelter, light, and water (p. 264)

compost a mixture of decomposing plants and soil (p. 251)

compound substance made up of two or more elements chemically combined (p. 30)

compound microscope a magnifying device that combines the magnifying power of both an objective lens and an eyepiece lens; passes light *through* the object and into the lens to deliver the image right side up (p. 160)

concentrated any mixture that has a lot of solute per volume of solution (p. 60)

concentration a ratio representing the amount of solute present in a solution (p. 45)

conduction a method of heat transfer that requires contact (p. 88)

consumer an organism that eats either a producer or another consumer (p. 242)

convection a method of heat transfer that involves currents (p. 89)

corrosion the wearing away of materials by a chemical reaction (p. 71)

corrosive a property of substances with a high or low pH that wear away other substances they contact (p. 70)

crystallization the separation process in which the solvent is evaporated, leaving crystals of solute behind (p. 52)

cycle the re-use of matter in ecological systems (p. 248)

cytoplasm the jelly-like organelle within plant cells that holds other organelles in place around the nucleus (p. 167)

D

death rate the number of individuals that died during a specified time (p. 258)

decomposer a living thing that breaks down dead plants and animals, returning their chemical elements to the environment (p. 242)

decomposition reaction a chemical reaction that breaks a compound into simpler substances (p. 31)

diabetes an illness that disables the body's ability to regulate the production of sugar (p. 225)

diet the amount and type of food you eat (p. 204)

digestive system the system of organs that converts food into energy the body can use (p. 188)

dilute describes a mixture that has very little solute per volume of solution (p. 60)

dissecting scope a magnifying device similar to a compound microscope but that has an eyepiece for each eye and illuminates the surface of an object rather than passing light through it (p. 162)

distance multiplier any simple machine that moves a load through a large distance but requires only a short effort distance (p. 138)

distillation the separation process in which the desired component is evaporated from the solution and collected (p. 55)

diversity see *biodiversity*

E

ecological pyramid a model showing the relative numbers of organisms or amount of energy available at each level in a food chain (p. 245)

ecosystem the sum of a community of living things and the environment in which they live (pp. 242 & 274)

EEG electroencephalogram; a tool that records changes in brain activity on a moving chart; a chart produced with such a tool (p. 191)

efficiency a comparison of the work the machine does with the energy it uses to do that work, usually given as a percentage (p. 145)

effort the force required to move an object (p. 134)

effort distance the distance between the fulcrum and the effort (p. 134)

EKG electrocardiogram (also ECG); a printed record of the rate and pattern of a heartbeat (p. 191)

electron microscope a magnifying device that uses a beam of electrons (rather than light) to create an image more than 600 000 times original size; includes both transmission and scanning electron microscopes (p. 158)

element a pure substance that cannot be broken down into simpler substances and contains only one kind of atom (p. 24)

element symbols one or two letters used to represent the name of an element (p. 35)

emigration departures from a population (p. 259)

endoplasmic reticulum ER; the organelle within cells that transports materials around and out of the cell (p. 167)

energy *physics* the ability to do work (p. 130); *biology* the source of the ability to move, do work, or cause change (p. 238)

enzyme a chemical that breaks down food during the digestive process (p. 207)

equilibrium balance (p. 129)

ER see *endoplasmic reticulum*

esophagus the part of the digestive system that pushes food to the stomach using wave-like muscle contractions (p. 188)

eutrophication the buildup of nutrients in an aquatic ecosystem causing excessive plant growth and reduced oxygen (p. 296)

exotic species any species that does not occur naturally in an ecosystem (p. 268)

extinction the elimination of a species from Earth (p. 286)

F

fad diet any short-lived idea or "craze" about how or what people should eat — often involving weight loss (p. 206)

fat a class of nutrient that is stored in the body for use as an energy source when carbohydrates are in short supply (p. 200)

fertilizer a natural or chemical substance used to add nutrients to soil and thus increase crop yields (p. 293)

first class lever a lever in which the fulcrum is found between the load and the effort (p. 134)

fixed pulley a pulley that does not move and does not change the effort required (p. 142)

food chain a model that shows how energy and matter pass from one organism to another in an ecosystem (p. 242)

food web a network of connected food chains that provides a complete model of how energy and matter are transferred from one organism to another in an ecosystem (p. 244)

force a push or pull; an influence that causes motion (p. 132)

force multiplier any simple machine that exerts a large force on the load but requires only a small effort (p. 139)

fossil fuels the group of fuels derived from the remains of organisms that lived millions of years ago (p. 297)

friction resistance caused by two surfaces rubbing together (p. 82)

fulcrum the support point on which a lever pivots (p. 134)

G

gallstones crystallized cholesterol that forms in the gall bladder — an organ in the digestive system (p. 222)

gas the state of matter in which particles are far apart and moving quickly (p. 11)

global warming the trend toward increased average temperatures caused by excess carbon dioxide in Earth's atmosphere (p. 297)

glucose a sugar (food) produced during photosynthesis (pp. 183 & 238)

Golgi body the specialized part of the endoplasmic reticulum (ER) that packages and transports food and waste until the cell is ready to get rid of it (p. 167)

grassland a biome in which grass is the main vegetation and precipitation is low (p. 281)

gravel the largest particle found in soil; small stones (p. 278)

greenhouse effect the phenomenon caused by an insulating layer of carbon dioxide around Earth that lets radiation in but keeps heat from escaping (p. 297)

groups vertical columns in the periodic table containing elements with similar properties (p. 25)

H

habitat refers to an organism's shelter and food (p. 286)

hand lens a single, hand-held magnifying glass (p. 162)

heart a hollow muscle that pumps blood through the body (p. 188)

heart attack a severe reduction in the flow of blood to the heart, causing pain as the heart tissue begins to die (p. 227)

heartburn a burning sensation caused by stomach acids rising into the esophagus (p. 222)

heat the sum of kinetic energies of all particles in an object (p. 86)

heat absorption the rate at which a material absorbs heat (p. 106)

herbicide any chemical that kills unwanted plants (p. 292)

HHPS Hazardous Household Product Symbols; found on labels of household products that are reactive or dangerous, to alert users to potential hazards (p. 9)

hibernation a period of significantly reduced metabolic activity (just high enough to maintain life) to avoid harsh winter conditions (p. 181)

high blood pressure the illness in which a person has blood pressure that is routinely higher than normal (p. 221)

homeostasis the tendency or ability of body systems to stay in balance (p. 216)

horizon the horizontal layers in soil (p. 279)

host any organism that has a parasite (p. 264)

humus the part of soil consisting of broken down plant fibres, soil particles, and decayed organisms (p. 278)

I

immigration arrivals (not including births) into a population (p. 258)

inclined plane a simple machine that consists of a sloping surface such as a ramp, switchback, or screw (p. 132)

indicator a substance that changes colour in the presence of an acid or base (p. 64)

individual one member of a population (p. 256)

insecticide any chemical that kills unwanted insects (p. 292)

insoluble the common property of substances that will not dissolve (p. 46)

insulation any material that slows heat transfer (p. 111)

insulin a hormone that regulates the production of glucose (p. 217)

J

joule J; the standard way of reporting work done; 1 J = 1 Nm (p. 132)

K

kidney dialysis the procedure that feeds blood full of wastes through a large external blood purifier and then returns it to the body (p. 229)

kilowatt hour kW•h; the amount of electricity used when 1000 W of power is used for 1 h (p. 146)

kinetic energy a form of energy associated with motion (p. 86)

L

land breeze a mild wind that flows from the cool land out to the warmer sea (p. 95)

landfill a waste disposal area that consists of a large pit in the ground and various features that prevent toxic chemicals from entering the environment (p. 302)

large intestine the part of the digestive system that absorbs vitamins, minerals, and water (p. 188)

latitude a measure in degrees of how far north or south a place is from the equator (p. 276)

leaching the washing out of materials by water running through the soil (p. 278)

life function see *life processes*

life processes the seven activities carried out by cells and organ systems (pp. 165 &180)

limiting factors the factors that limit the number of individuals that an environment can support (p. 261)

liquid the state of matter in which particles are touching, but can move past each other (p. 11)

litmus paper an indicator strip that has been treated with a weak solution of litmus (p. 64)

living the class of objects in which life processes are found (p. 165)

load the object that is moved by a lever (p. 134)

load distance the distance between the fulcrum and the load (p. 134)

M

malnutrition a condition of ill-health caused by a diet that is missing essential nutrients (p. 198)

matter anything that has mass and takes up space (p. 10)

mechanical digestion the part of the digestive process in which the teeth and stomach muscles break food into smaller pieces (p. 207)

mechanical mixture a mixture in which more than one type of particle is visible (p. 42)

metals elements that are good conductors of heat and electricity, and that can be bent, stretched into a wire, and polished until shiny (p. 26)

metalloid elements that share some properties with metals and some with non-metals (p. 26)

microscope a magnifying device that allows the observation of objects and structures too small to view with the naked eye (p. 158)

mineral nutrients that help carry out life functions (p. 200)

mitochondrion the organelle within cells that uses oxygen and changes digested food into energy; the "powerhouse" of the cell (p. 167)

mixed diet a diet that contains a wide variety of foods (p. 204)

mixture any substance made of more than one type of particle (p. 16)

moderate the averaging of temperatures that is caused by large bodies of water that store large amounts of thermal energy (p. 97)

mountain and foothill a biome characterized by coniferous forests and extreme variations in temperature and amounts of precipitation (p. 281)

moveable pulley a pulley that moves with the load and reduces the effort required (p. 142)

MSDS Material Safety Data Sheet; provides detailed information about a chemical in the workplace, including physical and chemical properties, safe handling, first aid, and disposal procedures (p. 8)

N

neutral a substance with a pH of about 7 that has none of the properties of an acid or a base (p. 63)

neutralization the chemical reaction that cancels out acidic and basic properties when an acid and a base combine (p. 70)

newton-metre N•m; the work done when one newton of force (1 N) is used for a distance of 1 m (p. 132)

nitrogen cycle the re-use or cycling of nitrogen in nature through food chains, decomposition, and fixing/producing bacteria (p. 250)

N•m see *newton-metre*

non-biodegradable any material that cannot be broken down by organisms in the environment or that is broken down very slowly (p. 291)

non-living objects in which life processes are *not* found (p. 165)

non-metals elements which are poor conductors of heat and electricity (p. 26)

nucleus the organelle found in both plant and animal cells that serves as the "brain" or control centre; contains the DNA, directs overall functioning, and controls the manufacture of materials within the cell (p. 166)

nutrient a substance found in foods that provides nourishment to living things (p. 198)

nutrition a branch of science that studies foods and how the body uses them (p. 198)

O

obesity a medical condition characterized by the storage of excessive fat; when fat makes up 10 percent or more of a person's body weight (p. 222)

organ two or more tissues combined and working together to perform a specialized role (p. 164)

organelle any part of a cell that carries out a specific function or role (p. 164)

organism any living thing that carries out all of the seven activities necessary to survive (p. 165)

oxygen cycle see *carbon and oxygen cycles*

ozone layer an invisible layer of gas in the atmosphere about 15–35 km above Earth's surface that absorbs harmful ultraviolet (UV) radiation from the Sun (p. 300)

P

pacemaker an electrical device implanted under the collarbone that releases electrical charges to stimulate a steady heartbeat (p. 228)

parasite any organism that lives on or in another organism at the expense of that organism (p. 264)

parasitism the relationship between host and parasite (p. 264)

parkland the biome in which the main plants are trees and grasses (p. 281)

particle theory of matter the explanation of the nature of matter that considers atoms to be like tiny particles and that describes their nature and behaviour (p. 10)

periodic table the chart on which all the elements are organized (p. 24)

periods horizontal rows of elements in the periodic table (p. 25)

pesticide any chemical spray that kills "pest" (unwanted) plants or animals (p. 269 & 292)

pH a number that tells you how acidic or basic a substance is (p. 65)

pH scale a scale from 0 to 14 that classifies how acidic or basic substances are (p. 65)

photosynthesis the process by which chloroplasts in plant cells convert sunlight, water, and carbon dioxide into glucose and oxygen (pp. 183 & 238)

physical property a characteristic of a substance that can change without a new substance being formed (p. 12)

population any group of individuals of the same species living together in the same place at the same time (p. 256)

predation the killing and eating of one animal by another (p. 264)

predator any animal that catches, kills, and eats other animals (p. 264)

prey any animal that is eaten by other animals (p. 264)

primary consumer an animal that eats plants or producers (p. 244)

producer a class of organisms that can make their own food — usually through photosynthesis (p. 242)

protein a class of nutrients that is used to build body tissue, regulate chemical activity, and supply energy when carbohydrates and fats are not available (p. 200)

pulley a simple machine consisting of a grooved wheel on which a rope turns (p. 140)

pure substance any substance made of only one type of particle (p. 16)

pyramid of energy a model showing the total amount of chemical energy that flows through each feeding level in a food chain (p. 246)

R

radiation a method of heat transfer that involves electromagnetic waves (p. 89)

recycle one of the three strategies for waste reduction in which discarded materials are broken down and used to form new products (p. 303)

reduce one of the three strategies for reducing waste; buying items with less packaging is one way to reduce waste (p. 303)

refrigerant any substance that cools; in refrigerators, the liquid that absorbs heat (p. 298)

reproductive rate the rate at which a pair of organisms can reproduce (p. 267)

resistance an organism's natural ability to not be killed by a pesticide (p. 293)

restoration a method of restoring wetlands by blocking drainage ditches and building small dams to allow flooding (p. 304)

re-use one of the three strategies for waste reduction in which new uses are found for products that would otherwise be thrown away (p. 303)

Robert Brown the first person to notice that particles jiggle faster as they are heated; see also *Brownian motion* (p. 83)

R-value a measure of how well insulation slows heat transfer — higher values mean less heat transfer (p. 111)

S

saliva the liquids in the mouth that contain enzymes that begin chemical digestion (p. 207)

sand grain-sized pieces of rock found in soil (p. 278)

sea breeze the cool wind that blows from a cool ocean or lake toward the warmer land (p. 94)

second class lever a lever in which the load is found between the fulcrum and the effort (p. 136)

secondary consumer an animal that eats primary consumers; an animal that eats animals that eat plants (p. 244)

silt tiny rock particles found in soil; these particles are larger than clay particles but smaller than sand (p. 278)

simple machine any tool or machine that involves only one movement (p. 132)

small intestine the part of the digestive system that neutralizes stomach acid, absorbs 80–90 percent of nutrients, and releases chemicals that digest food (p. 188)

soil the thin layer of rock fragments and decomposed plant matter that covers the land (p. 278)

soil crumbs particles of humus that have formed clumps (p. 278)

solid the state of matter in which particles are packed tightly together and cannot move very much (p. 11)

solubility a measure of how easily a solute will dissolve in a solvent to make a solution (p. 46)

soluble the common property of all substances that will dissolve (p. 46)

solute the substance that dissolves to form a solution (p. 43)

solution a uniform mixture made of two or more substances (p. 43)

solvent the substance in which the solute dissolves to form a solution (p. 43)

specialized designed for a specific function (p. 181)

species at risk plants and animals close to becoming extinct (p. 286)

specific heat capacity the measure of a substance's ability to absorb or lose heat given in J/g•°C (p. 108)

sphygmomanometer see *blood pressure cuff*

starch the carbohydrate form in which plants store excess glucose produced during photosynthesis (p. 240)

states of matter the three common forms in which matter exists: solid, liquid, and gas (p. 11)

stomach the part of the digestive system that uses muscle contractions to mix food; releases acids that activate digestive chemicals (p. 188)

system any group of organs working together to perform a specialized role (p. 164)

T

temperature the average kinetic energy of all particles in an object (p. 86)

terrestrial ecosystem any ecosystem on land (p. 275)

tertiary consumer an animal that eats secondary consumers; an animal that eats animals that eat other animals (p. 244)

theory an explanation of something that has been supported by repeated experimental results (p. 10)

thermal energy see *heat*

third class lever a lever in which the effort is found between the fulcrum and the load (p. 137)

tissue a structure made up of cells combined to perform a specific task or function (p. 164)

topography the physical features in an area (p. 276)

topsoil the top layer (Horizon A) of soil (p. 279)

torpor state of inactivity or dormancy during which body processes slow due to extremely hot or dry conditions (p. 181)

U

ulcers holes or breaks in the lining of the esophagus or stomach caused when normal digestive juices destroy the protective mucous lining (p. 225)

V

vacuole the sack-like organelle within cells that stores water, food, or waste (p. 167)

vacuum bottle a container that slows all three methods of heat transfer (p. 117)

vegetarian a class of diet that limits or eliminates the consumption of animal products (p. 206)

vein a blood vessel that takes oxygen-poor blood from body tissues back to the heart (p. 188)

vitamin a class of nutrients that is organized according to whether they can be absorbed in fat or water (p. 200)

W

water cycle the re-use or cycling of water in nature through condensation, precipitation, and evaporation/transpiration (p. 248)

wetland any area in which water remains at or just below the ground's surface (p. 304)

wheel and axle a simple machine that consists of a wheel turning a smaller rod (p. 143)

WHMIS Workplace Hazardous Materials Information System; provides detailed information on first aid and the storage, handling, and disposal of any chemical found in the workplace (p. 8)

work w; what is done when a force moves an object ($w = f \times d$); the result of force x distance (p. 132)

X

X ray a form of electromagnetic radiation that can be used to "see through" soft tissue like skin and muscles to make a picture of dense substances such as bone (p. 191)